

# Early STEM in Library Programs for Young Children

# Sponsored by the Texas State Library and Archives Commission

Presented by

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# Sample Toddler Program WHAT SHAPE IS IT?

**Early Literacy Message:** "Good Morning and Welcome to Toddler Time. My name is \_\_\_\_\_ and I am so glad all of you are here! Today your toddlers will learn early language, literacy, math, and science skills as we sing, read, talk, play, and have fun together. This is a very important time for your child's brain development and learning. Thank you for bringing your children here today for this opportunity to grow and learn."

# **Opening Song**

#### The More We Get Together

(Include some or all of the children's names in the second verse, or repeat the verse until all of their names are included, if the group is small. Substitute the words "play" and "dance" for additional verses.)

The more we get together, together, together.

The more we get together, the happier we'll be.

'Cause your friends are my friends and my friends are your friends.

The more we get together the happier we'll be.

There's Kayla and Elena and Frasier and Erin.

The more we get together, the happier we'll be.

'Cause your friends are my friends and my friends are your friends.

The more we get together the happier we'll be.

#### **Books to Read Aloud**

(Select two to four, or read your favorites)

Dreaming Up: A Celebration of Building by Christy Hale It Looked Like Spilt Milk by Charles Green Shaw Shape by Shape by Suse MacDonald Shape Capers by Cathryn Falwell Shapes by Guy Smalley The Wing on a Flea: A Book about Shapes by Emberley

# **Literacy Props**

(Let the children play with the literacy props after storytime.)

Shape posters and puzzles Shape sorters Magnetic or Plastic Tangrams Blocks and Legos®

# **Math Activities**

# **Identifying and Sorting Shapes**

Bring out an assortment of blocks, tangrams, and other objects with a variety of shapes. Hold them up and let the children call out the shapes. Place all of the objects that are the same shape together on a table or shelf so that the children can see them

Ask the children to name the shapes of objects in the room such as doors, windows, books, CD's, etc. Play "I Spy" and ask the children to find shapes that you see in the room. You may wish to place shapes around the room.

Show the children that squares, rectangles and other four-sided shapes such as parallelagrams all have four corners. Show the children that triangles have three sides and three points, and that the point where two sides meet is called a vertex.

# Song

#### Draw a Circle in the Air

(Sing to the tune of "Put Your Finger in the Air." Give the children colorful scarves or streamers, or let them draw each shape in the air with their index finger.)

Draw a circle in the air, in the air.

Draw a circle in the air, in the air.

Draw a circle in the air.

Oh what fun to make one there.

Draw a circle in the air in the air.

#### Verses:

Draw a square in the air...

Draw a diamond in the air...

Draw a triangle in the air...

# **Flannelboard Story**

# Flannel Board Clown

Cut the following shapes from different colors of felt pieces to make a clown. Place each shape on the flannel board randomly and ask the children what it is called. Put the shapes together and show the children how to form a clown. Then sing the song below, "Funny Clown."

- A circle -- the clown's face
- A triangle -- the top of the clown's hat
- A thin rectangle -- the brim of the clown's hat
- A circle -- the clown's nose
- Two stars -- the clown's eyes
- A moon -- the clown's mouth

# Song

# **Funny Clown**

(Sing to "Frere Jacques")

Funny clown, funny clown, Jump around, jump around. Making funny faces, Spinning in circles. Funny clown, funny clown.

Funny clown, funny clown, Spin around, spin around. Point to your big nose. Run on your big toes. Funny clown, funny clown.

**Early Math Literacy Message for Caregivers:** Recognizing shapes is a math skill that enables children to make comparisons. Children learn that objects may be the same in one way and different in another. This will help children recognize and learn letters and learn to read.

#### **Book Extension Activities**

# It Looked Like Spilt Milk

Read *It Looked Like Spilt Milk* by Charles Green Shaw. Place felt shapes based on the illustrations in the book onto on a blue flannel board as you read. Pause to allow the children to call out each shape as you place it on the flannel board. Add green grass across bottom edge to turn the shapes into clouds floating in the sky. Remove the felt shapes and replace them, one by one, on the flannel board, asking the children to name the shapes

Ask the children if they have ever seen shapes in the clouds. Ask them to look for shapes in the clouds next time they are outside and tell their parents what they see. If there is a safe outdoor area next to the library, walk outside with the children and let them look for shapes in the clouds. Give them plenty of time to look, and then ask them to talk about the shapes they see.

# **Building with Shapes**

Read *Shape by Shape* by Suse MacDonald. Let the children build with blocks or Legos®. Ask them to tell you about their structures, what they are, and what shapes they are using to build them. Ask the children to build towers and to predict how high the structure can be built before it will topple over. Go around the room and admire the children's work and ask them how high they built their towers. Allow time for the children to talk about their structures with their caregivers.

Bring out a blocks in a variety of shapes, arches, columns, squares, rectangles, triangles, cylinders, and circles. Allow the children to use their imagination and creativity. Go around the room and admire the children's work and ask them to share about their structures. Allow time for the children to talk about their structures with their caregivers.

Let the children know that there are two simple rules: they cannot throw blocks or knock down anyone's structure.

# Stages of Block Play

For more information on the Stages of Block Play, see "How Block Play Promotes Development" on the Teaching Strategies web site at www.teachingstrategies.com/content/pageDocs/CC4\_Ch6\_exrpt.pdf.

Stage I: Carrying Blocks

Stage II: Piling Blocks and Making Roads

Stage III: Connecting Blocks to Create Structures

Stage IV: Making Elaborate Constructions

# Songs

# This is the Way We Build a House

(Sing to the tune of "Mulberry Bush")

This is the way we build a house, Build a house, build a house. This is the way we build a house, So early in the morning.

This is the way we hammer the nails ... This is the way we saw the wood ... This is the way we paint the house ...

#### Johnny Works with One Hammer

(Children move one fist up and down in first verse; both fists in 2<sup>nd</sup> verse; both fists and a leg in 3<sup>rd</sup> verse; both fists and both legs in 4<sup>th</sup> verse; both fists, both legs, and nod head in the last verse; and they lay their head on their hands on the last line, as if going to sleep.)

Johnny works with 1 hammer, 1 hammer, 1 hammer. Johnny works 1 hammer, then he works with 2.

Johnny works 2 hammers ...
Johnny works 3 hammers ...
Johnny works 4 hammers ...
Johnny works 5 hammers, 5 hammers, 5 hammers.

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Johnny works 5 hammers, then he goes to sleep.

# **Closing Song**

# So Long

(If the group is small, insert their names and repeat the verse until all are included.)

So long, it's been good to see you,

So long, it's been good to see you,

So long, it's been good to see you,

So long, and I'll see you next week.

# **Early Writing Activities**

- Give the children paper and crayons or markers and let them practice drawing shapes. Ask if they can put the shapes together to draw a picture. Let them tell their caregivers about their pictures.
- Put clear hair gel into plastic ziplock bags and seal them. Do not fill them too full. Tape
  the plastic bags to pieces of poster board. Let the children practice drawing shapes with
  their fingers, on the outside of the bag.

#### Craft

# Clay Shapes

#### **Materials**

- Table
- Clay
- Wax paper or styrofoam trays

#### **Directions**

Children roll pieces of clay back and forth with both hands to create snakes. They then bend and shape the clay snakes to form shapes. When they finish making shapes, they can dry them on wax paper or on a styrofoam tray.

# **Cleanup Song**

(Pass a bag or box around and let the children help pick up toys. Sing this song to the tune of "Here We Go 'Round the Mulberry Bush" to make cleanup fun.)

This is the way we pick up our toys, Pick up our toys, pick up our toys, This is the way we pick up our toys, All around the room.

# Sample Preschool Program HOW DO WE MEASURE UP?

**Early Literacy Message:** "Good Morning and Welcome to Storytime. My name is \_\_\_\_\_ and I am so glad all of you are here! Today your children will learn early language, literacy, math, and science skills as we sing, read, talk, play, and have fun together. This is a very important time for your child's brain development and learning. Thank you for brining your children here today for this opportunity to grow and learn."

# **Opening Song**

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The more we get together, the happier we'll be.

'Cause your friends are my friends and my friends are your friends.

The more we get together the happier we'll be.

#### **Books to Read Aloud**

(Select two to four, or read your favorites)

Actual Size by Steve Jenkins
Inch by Inch by Leo Lionni
Just a Little Bit by Ann Tompert
Little Gorilla by Ruth Bornstein
The Three Billy Goats Gruff by P.C. Asbjornsen
The Very Hungry Caterpillar by Eric Carle
Too Big Too Small Just Right by Frances Minters

#### **Literacy Props**

(Let the children play with the literacy props after storytime.)

Height Chart Balance Bucket Yard Stick

**Early Math Literacy Message for Caregivers:** Comparing and measuring are ways to describe and quantify the relationships between and among things. The concept of measurement can be taught at an early age using nonstandard measurement tools.

Children will learn measuring concepts that will lead to success in math when they enter school.

# **Math Activities**

# Measuring Height and Length

The concept of measurement can be taught at an early age using nonstandard measurement tools. This will form a foundation for understanding measurement with standard tools such as rulers and measuring tapes. Read *Inch by Inch* by Leo Lionni and let the children measure toys, puppets, stuffed animals, objects, and people with nonstandard measures.

In advance, make 2 sets of caterpillars, one approximately 12 inches long and one approximately 9 inches long. Cut out three 4" circles and three 3" circles. Draw a face and antennae for the caterpillar on one of the large and on one of the small circles. Laminate the three equal sized circles together to form a caterpillar.

Give a caterpillar of each size to each child. Ask them to predict how many caterpillars tall they are, and how many caterpillars tall their parents are. Ask if they think it will take more small or large caterpillars to measure them. Let the children and their parents take turns measuring each other with the caterpillars and comparing their predictions with their measurements.

Let the children and caregivers measure each other and objects in the room with other nonstandard measures, such as straws, crayons, books, sheets of paper, their hands, or their feet.

# How Do I Measure Up?

Part of developing positive self-esteem is becoming aware of our own bodies, comparing them to others, and accepting our bodies as they are. In this measuring activity, children learn to use a non-standard measurement to compare their height and the length and circumference of different parts of their bodies. They will learn some surprising relationships between their height, arm span, and the circumference of their heads.

- Let each child hold one end of a length of string at the top of her head. A parent or caregiver pulls it straight down to the floor and cuts the string. This will be the child's height.
- Ask the child to stretch her arms as far apart as possible. Ask her to guess which is longer, her height or arm span. The caregiver stretches the string to see how the child's height and arm span compare. Ask the child which is longer, her height or arm span. (They will be approximately equal.)
- 3. Let the child guess how many times the string will wrap around her forehead. Then see how many times it actually wraps around her forehead. (The string will wrap approximately 3 times around the forehead.)
- 4. Let the child help the caregiver measure herself.

# Measuring and Comparing Weight

Read *Just a Little Bit* by Ann Tompert. Ask the children if they can name things in the storytime room that are heavy and some that are light. Bring out a variety of small, heavy objects such as wooden blocks and toys, rocks, etc., including some of the things that the children name. Also bring in a variety of light items such as crayons, leaves, twigs, shells, and feathers, including some of the things that the children name. Hold up each item and ask the children if it is heavy or light, and sort them into two groups. Bring up a few children and put one heavy and one light item into each of their hands. Ask which one is heaviest and which one is lightest. Let all of the children take turns holding two objects and reporting which is heavier and which is lighter.

Hold up two toys that are close in size, such as puppets or stuffed animals, and ask the children which one they think is heaviest. A Beanie Baby and a puppet are good choices for this activity since Beanie Babies contain heavy beans and puppets have a hollow space to insert a hand. Place the toys in each side of a balance bucket and ask the children which one is heaviest. You can make a balance bucket by hanging to equal size buckets at the end of a sturdy hanger.

Remove the heaviest toy and begin placing small items of equal size such as linking cubes (or crayons) into the bucket opposite the lightest toy, one by one. Let the children count as you add the amount of linking cubes that it takes to balance the lightest toy. The weight of that number of linking cubes equals the weight of the lightest toy. Connect the linking cubes in groups of 5 or 10 and place them beside the lightest toy. Draw a simple T-Graph with the heavy and light toy at the top of each column. Draw a dot or hash mark for each linking cube in the column for the lightest toy.

Then put the heaviest toy into a bucket and place linking cubes into the opposite bucket, one by one. Let the children count as you add the amount of linking cubes that it takes to balance the heaviest toy. The weight of that number of linking cubes equals the weight of the heaviest toy. Connect the linking cubes in groups of 5 or 10 and place them beside the heaviest toy. Draw a dot or a hash mark for each linking cube in the column for the heaviest toy.

Let the children compare how many linking cubes are equal to the weight of each of the toys. How many linking cubes did it take to balance the lightest toy? How many did it take to balance the heaviest toy? Write the numbers at the bottom of each column on the T-Graph. Ask they children which toy is heaviest.

After the program ends, let the children play with the balance bucket and continue to measure objects and toys in the room.

# Songs

# The Measuring Song

(Adapted by Christine McNew. Sing to the tune of "The Garden Song" by David Mallet.)

Inch by inch, head to toe, I'm gonna measure how I grow. A caterpillar, string, or straw. And I can measure anything! Step by step, day by day, I'm gonna measure how much I weigh. Gonna see how much I've grown, Cause I'm growing every day!

Word by word, song by song, I'm gonna laugh and play and learn. Gonna grow up happy and strong, And I'll read to you one day!

Inch by inch, head to toe, I'm gonna measure how I grow. A caterpillar, string, or straw. And I can measure anything!

# The Ants Go Marching

The ants go marching one by one, hurrah, hurrah The ants go marching one by one, hurrah, hurrah The ants go marching one by one, The little one stops to suck his thumb And they all go marching down to the ground To get out of the rain, BOOM! BOOM!

The ants go marching two by two ... The little one stops to tie his shoe
The ants go marching three by three ... The little one stops to climb a tree
The ants go marching four by four ... The little one stops to shut the door
The ants go marching five by five ... The little one stops to take a dive
The ants go marching six by six ... The little one stops to pick up sticks
The ants go marching seven by seven ... The little one stops to pray to heaven
The ants go marching eight by eight ... The little one stops to shut the gate
The ants go marching nine by nine ... The little one stops to check the time
The ants go marching ten by ten ... The little one stops to say "THE END"

# **Closing Song**

#### So Long

(If the group is small, insert their names and repeat the verse until all are included.)

So long, it's been good to see you, So long, it's been good to see you, So long, it's been good to see you, So long, and I'll see you next week.

# Resources

#### Children's Books in the Presentation

Bathtime, Maisy! by Lucy Cousins The Caterpillar and the Polliwog by Jack Kent Dreaming Up by Christi Hale Five Creatures by Emily Jenkins Hershey's Weights and Measures Book by Jerry Pallotta How Tall, How Short, How Far Away? by David A. Adler I Face the Wind by Vicki Cobb In the Rain with Baby Duck by Amy Hest Inch by Inch by Leo Lionni Inchworm and a Half by Elinor J. Pinczes Jonathan and His Mommy by Irene Smalls Just a Little Bit by Ann Tompert Just a Minute by Teddy Slater Max Found Two Sticks by Brian Pinkney Pattern Fish and Pattern Bugs by Trudy Harris The Snowy Day by Ezra Jack Keats The Very Hungry Caterpillar by Eric Carle W is for Wind: A Weather Alphabet by Pat Michaels Wind by Marion Dane Bauer The Wind Blew by Pat Hutchins

#### **Professional Resources**

ALSC Blog Posts on STEM Programs for Preschoolers - by Amy Koester

Gravity Science: A STEM Program for Preschoolers www.alsc.ala.org/blog/2013/08/gravity-science-a-stem-program-for-preschoolers/

Make a Splash: Water Science for Preschoolers www.alsc.ala.org/blog/2013/06/make-a-splash-water-science-for-preschoolers/

Color Science: A STEM Program for Preschoolers www.alsc.ala.org/blog/2013/02/color-science-a-stem-program-for-preschoolers/

Body Science for Preschoolers: Using our brains to learn about our bodies <a href="https://www.alsc.ala.org/blog/2013/04/body-science-for-preschoolers-using-our-brains-to-learn-about-our-bodies/">www.alsc.ala.org/blog/2013/04/body-science-for-preschoolers-using-our-brains-to-learn-about-our-bodies/</a>

Oh, the Weather Outside is Delightful–for Preschool Science www.alsc.ala.org/blog/2012/12/oh-the-weather-outside-is-delightful-for-preschool-science/

The Three Little Pigs & the Preschool Science

# www.alsc.ala.org/blog/2012/10/the-three-little-pigs-the-preschool-science/

Anderson, Sally. Math and Science Investigations: Helping Young Learners Make Big
Discoveries
How Many Ways Can You Make Five?: A Parent's Guide to Exploring Math with
Children's Books
Where Does My Shadow Sleep?: A Parent's Guide to Exploring Science with Children's
Book

Amy Koester's Blog - The Show Me Librarian - All Things STEAM http://showmelibrarian.blogspot.com/p/all-things-steam.html

Amy Koester's Stem Programming Board on Pinterest www.pinterest.com/fallingflannel/stem-programming/

"Full STEAM Ahead: Injecting Art and Creativity into STEM" by Amy Koester.
School Library Journal, October 1, 2013.
www.slj.com/2013/10/programs/full-steam-ahead-injecting-art-and-creativity-into-stem/

Bedtime Math <a href="http://bedtimemath.org/">http://bedtimemath.org/</a>

Burgeon Interactives
<a href="http://burgeongroup.com/interactive-panels.html">http://burgeongroup.com/interactive-panels.html</a>
<a href="http://librainium.org/burgeongroup/index.html">http://librainium.org/burgeongroup/index.html</a>

Cheryl Heid: The Programming Librarian Blog

Boldly Going into the World of STEM @ Your Library, or ... You Can Be a STEM Rock Star!

www.programminglibrarian.org/library/planning/boldly-going-into-the-world-of-stem.html#.Umf0YPmG3wh

Great (and Affordable) Programs STEM from Partnerships www.programminglibrarian.org/library/planning/stem-from-partnerships.html#.Umf1DvmG3wh

CTLS, Inc. - Connecting Texas Libraries Statewide – List of Science Oriented Performers and Speakers

www.ctls.net/wp-content/uploads/2012/04/science-program-presenters1.pdf

Education.com – Preschool Science Activities www.education.com/activity/preschool/science/

Erin Warzola's Blog: Falling Flannelboards
http://fallingflannelboards.wordpress.com/category/stem/

Every Child Ready to Read www.everychildreadytoread.org http://everychildreadytoread.ning.com

# http://facebook.com/everychild

Family Education – Learning Activities for Preschoolers <a href="http://fun.familyeducation.com/preschool/extracurricular-activities/33392.html">http://fun.familyeducation.com/preschool/extracurricular-activities/33392.html</a>

Fun Stuff to Do (Tangram shapes) www.fun-stuff-to-do.com/tangrams.html

Growing Up WILD www.projectwild.org/growingupwild.htm

Idaho Commission on Libraries <a href="http://libraries.idaho.gov/STEM-Resources">http://libraries.idaho.gov/STEM-Resources</a>

LEGO® DUPLO® Read, Build, Play <a href="http://readbuildplay.com">http://readbuildplay.com</a>

Math at Play – Infants, Toddlers, and Two's www.mathatplay.org/resources itt.html

Mixing in Math http://mixinginmath.terc.edu/

NAEYC - Math Talk with Toddlers

http://families.naeyc.org/learning-and-development/music-math-more/math-talk-infants-and-toddlers

NAEYC - Supporting the Scientific Thinking and Inquiry of Toddlers and Preschoolers through Play (PDF)

www.naevc.org/yc/files/yc/file/201205/Hamlin YC0512.pdf

NAEYC – Science in the Early Years (PDF) www.naeyc.org/tyc/files/tyc/file/V4N5/Science%20in%20the%20Air.pdf

NAEYC – Science in the Preschool Classroom (PDF) www.naeyc.org/files/yc/file/200209/PrinterFriendly\_ScienceInThePreschoolClassroom.pdf

PBS Baby and Toddler Math Activities www.pbs.org/parents/education/math/activities/baby-toddler/

PBS Science games for Preschool and K www.pbs.org/parents/education/science/games/preschooler-kindergarten/

PBS Kids – Sid the Science Guy <a href="http://pbskids.org/sid/">http://pbskids.org/sid/</a>

PBS Science Games http://pbskids.org/games/science.html

PBS Explorer's Guide

# www.pbs.org/parents/catinthehat/explorer\_guide\_science\_young\_children.html

Read! Build! Play! (Association of Library Services to Children) <a href="http://readbuildplay.com/">http://readbuildplay.com/</a>

Read! Build! Play! Downloadable Librarian Toolkit <a href="http://readbuildplay.com/Read-Build-Play\_Librarian-Toolkit.pdf">http://readbuildplay.com/Read-Build-Play\_Librarian-Toolkit.pdf</a>

Science Bob www.sciencebob.com/

Science for Preschoolers – Preschool Science Activities <a href="http://scienceforpreschoolers.com/preschool-science-activities/">http://scienceforpreschoolers.com/preschool-science-activities/</a>

#### Sesame Street

One of These Things (is Not Like The Others) Words and Music by Joe Raposo and Jon Stone www.metrolyrics.com/one-of-these-things-is-not-like-the-others-lyrics-sesame-street.html

Simply Stem Wiki

http://simplystem.wikispaces.com/Welcome+to+Simply+S.T.E.M.

What's the Big Idea? Science and Math for Young Children in Public Libraries (A Program of the Vermont Center for the Book) http://bigidea.mothergooseprograms.org

Zero to Three – Developing Early Math Skills www.zerotothree.org/child-development/early-development/supporting-early-math-skills.html